Amendments to Claims

This listing of claims will replace all prior revisions and listings of claims in this application.

Listing of Claims

1. (**Currently Amended**) A method comprising:

generating a phase-shift keyed optical signal; and

propagating the phase shift keyed optical signal through a semiconductor optical amplifier in deep saturation, wherein -4dBm < P_{IN} < 4dBm, such that an optical signal exhibiting a regulated, -amplified optical power is produced;

wherein the amplified optical power is regulated to a saturation output power such that ΔP_{OUT} (dB)/ΔP_{IN}(dB) of the optical amplifier is less than about 0.25, wherein P_{OUT} is the power of the optical signal output from the amplifier, and P_{IN} is the power of the optical signal input into the amplifier.

2. (**Previously presented**) The method of claim 1, wherein the amplified optical power is regulated to about the saturation output power of the semiconductor optical amplifier.

3. (**Previsously Presented**) The method of claim 1, wherein a gain recovery time of the optical amplifier is larger than the bit period of the optical signal.

4. (**Original**) The method of claim 1, wherein the optical signal has a data-independent intensity profile.

5. (**Original**) The method of claim 1 wherein the optical signal is RZ-DPSK signal.

6. (**Original**) The method of claim 1, wherein the optical signal is an $\pi/2$-DPSK signal.

7. (**Original**) The method of claim 1, wherein the optical signal is a constant-intensity DPSK signal.

8. (**Original**) The method of claim 1, wherein the optical signal is an RZ-DQPSK signal.

9. (**Cancelled**)

10. (**Currently Amended**) A method for optical limiting amplification comprising:

inputting a phase-shift keyed optical signal having a data independent intensity profile into a semiconductor optical amplifier in a deep saturation regime wherein $-4dBm < P_{IN} < 4dBm$ such that an optical signal exhibiting a regulated, amplified optical power is produced and output, wherein $\Delta P_{OUT}(dB)/ \Delta P_{IN}(dB)$ is less than about 0.25, where P_{OUT} is the power of the optical signal output from the amplifier, and P_{IN} is the power of the optical signal input into the amplifier.

11. (**Previously Presented**) The method of claim 10, wherein a gain recovery time of the optical amplifier is larger than the bit period of the optical signal.

12. (**Original**) The method of claim 10, wherein the optical signal is an RZ-DPSK signal.

13. (**Original**) The method of claim 10, wherein the optical signal is an $\pi/2$-DPSK signal.

14. (**Original**) The method of claim 10, wherein the optical signal is a constant-intensity DPSK signal.

15. (**Original**) The method of claim 10, wherein the optical signal is an RZ-DQPSK signal.

16.(**Withdrawn**) A channel power equalizer comprising:

a demultiplexer for demultiplexing an optical signal into a plurality of channels, each said channels having a different optical wavelength;

a plurality of semiconductor optical amplifiers optically coupled to the demultiplexer for separately providing optical amplification to the respective ones of the plurality of channels; and

a multiplexer coupled to each one of the plurality of semiconductor optical amplifiers, for multiplexing the plurality of optical channels,

such that each one of the plurality of optical channels in the multiplexed signal has substantially equal optical power.

17. (**Currently Amended**) An optical signal processor apparatus comprising:

a semiconductor optical amplifier device adapted to operate in deep saturation , wherein $-4dBm < P_{IN} < 4dBm$, and to receive an RZ-DPSK optical signal having an amplitude-shift keyed optical label portion, such that the optical label portion of the signal is removed upon propagation through the semiconductor optical amplifier device;

wherein $\Delta P_{OUT}(dB)/ \Delta P_{IN}(dB)$ is less than about 0.25, where P_{OUT} is the power of the optical signal output from the amplifiers, and P_{IN} is the power of the optical signal input into the amplifiers.

18. (**Withdrawn**) An optical add/drop multiplexer device comprising:

a demultiplexer for demultiplexing a multi-channel wavelength-division multiplexed phase shift keyed optical signal into a plurality of optical channels, each said channels having a different optical wavelength;

a multiplexer having a plurality of input ports, for multiplexing at least one of the plurality of optical channels received from the demultiplexer and at least one added channel; and

a plurality of semiconductor optical amplifiers optically coupled to each one of input ports of the multiplexer, wherein the plurality of semiconductor optical amplifiers are adapted to separately suppress transient optical power fluctuations in each one of the plurality of the optical channels, and provide optical power equalization between the plurality of optical channels to be multiplexed.

19. (**Currently Amended**) An optical communication system for transmitting multi-channel phase-shift keyed optical signals comprising:

a plurality of semiconductor optical amplifiers,

wherein the system is adapted to transmit the optical signals such that the plurality of semiconductor optical amplifiers operate ~~in deep saturation amplifier~~ in a deep saturation regime wherein $-4dBm < P_{IN} < 4dBm$ so as to provide optical power equalization of a plurality of channels of the multi-channel optical signals,

wherein $\Delta P_{OUT}(dB)/\ \Delta P_{IN}(dB)$ is less than about 0.25, where P_{OUT} is the power of the optical signal output from the amplifiers, and P_{IN} is the power of the optical signal input into the amplifiers.

20. (**Currently Amended**) An apparatus comprising:

a means for generating a phase-shift keyed optical signal; and

a means for propagating the optical signal through a semiconductor optical amplifier in deep saturation wherein $-4dBm < P_{IN} < 4dBm$ to regulate the amplified optical power;

wherein $\Delta P_{OUT}(dB)/\ \Delta P_{IN}(dB)$ is less than about 0.25, where P_{OUT} is the power of the optical signal output from the amplifiers, and P_{IN} is the power of the optical signal input into the amplifiers.